International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 11, November 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.11.2024.157

Original Research

Assessment of Risk Factors Profile of Diabetic Retinopathy

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Received: 06October 2024 Accepted: 19November 2024

Abstract

Background: Diabetic retinopathy (DR) constitutes a significant complication associated with diabetes mellitus (DM) and is recognized as a predominant cause of vision impairment among individuals of working age. Hence, the present study was conducted to assess risk factors profile of diabetic retinopathy.

Materials &Methods:A cohort of 100 patients diagnosed with diabetic retinopathy (DR) and an equal number of control subjects were recruited for the study. Comprehensive demographic and clinical information were gathered for all participants. Data collection was facilitated through a specially designed questionnaire that encompassed demographic variables such as gender and age, as well as aspects of metabolic control, diabetes mellitus (DM) profile, and associated comorbidities. Clinical records were initially reviewed to ascertain the presence or absence of DR, as determined by an ophthalmologist based on clinical observations validated through both direct and indirect ophthalmoscopy, in accordance with the international clinical diabetic retinopathy disease severity scale. Additionally, various risk factors linked to the development of DR were assessed.

Results: The mean age of the patients of the study group and control group was 51.3 years and 48.2 years respectively. There were 62 males and 38 females in the study group and there were 66 males and 34 females in the control group. Positive family history of diabetes was seen in 43 patients of the study group and in 12 patients of the control group. 65 percent of cases of study group had mild NPDR while 23 percent had moderate NPDR.Geriatric age, presence of dyslipidemia, hypertension & obesity along with positive family history of diabetes were found to be significant risk factors for occurrence of DR.

Conclusion: Diabetes mellitus is a complex metabolic disease with DR being one of its significant complications associated with significant morbidity. It is not possible to define which diabetic individuals will present retinopathy. However, it is possible to determine risk factors related to the development of retinopathy.

Key words: Retinopathy, Diabetic.

INTRODUCTION

Diabetic retinopathy (DR) constitutes a significant complication associated with diabetes mellitus (DM) and is recognized as a predominant cause of vision impairment among individuals of working age. The identification of DR is based on the clinical presentation of vascular irregularities within the retina. This condition is categorized into two distinct stages: non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR).[1, 2] NPDR is characterized as the initial phase of DR, where the primary findings in the retinal vasculature include heightened vascular permeability and capillary occlusion. During this phase, various retinal abnormalities such as microaneurysms, hemorrhages, and hard exudates can be observed through fundus photography, even though patients may not exhibit any symptoms.[3, 4]

Numerous systemic characteristics of diabetes have a significant impact on diabetic retinopathy (DR). Notably, hyperglycemia is fundamentally associated with DR, a relationship substantiated by pivotal large-scale clinical studies. The Diabetes Control and Complications Trial (DCCT) for Type 1 Diabetes (T1D) and the United Kingdom Prospective Diabetes Study (UKPDS) for Type 2 Diabetes (T2D) advocate for rigorous glycemic management, as measured by hemoglobin A1c (HbA1c), to postpone the onset and advancement of this complication. However, the necessity to prevent hypoglycemia can complicate the pursuit of intensive control for numerous patients. The critical nature of managing glycemia early in the

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diabetes trajectory is underscored by substantial preclinical and clinical findings that highlight the enduring effects of stringent glycemic regulation.[5- 7] Hence; the present study was conducted to assess risk factors profile of diabetic retinopathy.

MATERIALS & METHODS

A cohort of 100 patients diagnosed with diabetic retinopathy (DR) and an equal number of control subjects were recruited for the study. Comprehensive demographic and clinical information were gathered for all participants. Data collection was facilitated through a specially designed questionnaire that encompassed demographic variables such as gender and age, as well as aspects of metabolic control, diabetes mellitus (DM) profile, and associated comorbidities. Clinical records were initially reviewed to ascertain the presence or absence of DR, as determined by an ophthalmologist based on clinical observations validated through both direct and indirect ophthalmoscopy, in accordance with the international clinical diabetic retinopathy disease severity scale. Additionally, various risk factors linked to the development of DR were assessed.All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

RESULTS

The mean age of the patients of the study group and control group was 51.3 years and 48.2 years respectively. There were 62 males and 38 females in the study group and there were 66 males and 34 females in the control group. Positive family history of diabetes was seen in 43 patients of the study group and in 12 patients of the control group. 65 percent of cases of study group had mild NPDR while 23 percent had moderate NPDR.Geriatric age, presence of dyslipidemia, hypertension & obesity along with positive family history of diabetes were found to be significant risk factors for occurrence of DR.

Table 1: Demographic data

Variable	Study group	Control group
Mean age	51.3	48.2
Males	62	66
Females	38	34
Family history of diabetes	43	12

Table 2: Grades of retinopathy among study group

Grades	Number	Percentage
Mild	65	65
Moderate	23	23
Severe	7	7
PDR	5	5

Non-proliferative diabetic retinopathy (NPDR)

Table 3: Risk factors of DR

Risk factors	95% CI	p-value
Duration of diabetes of more than 15 years	4.5 to 15.9	0.001 (Significant)
Male gender	0.23 to 4.3	0.812
Age of more than 65 years	5.9 to 17.3	0.000 (Significant)
Presence of dyslipidemia	4.2 to 16.8	0.000 (Significant)
Positive family history of diabetes	5.9 to 20.3	0.002 (Significant)
Presence of hypertension	3.8 to 13.9	0.001 (Significant)
Presence of obesity	6.7 to 16.3	0.001 (Significant)

DISCUSSION

Diabetic retinopathy (DR) significantly affects the quality of life for individuals with diabetes and remains the primary cause of vision impairment among working-age adults (ages 20 to 65) in developed nations. Currently, approximately 90 million individuals with diabetes are affected by DR, which includes 17 million with proliferative diabetic retinopathy (PDR), 21 million with diabetic macular edema (DME), and 28 million who face a substantial risk to their vision. The prevalence of DR is projected to double by 2025 if more effective preventive and therapeutic measures are not implemented.[8]

In nearly all individuals with type 1 diabetes (T1D), the initial two decades following the onset of the disease can be marked by the development of DR, while around two-thirds of those with type 2 diabetes (T2D) may also experience some form of the condition. DR is often a

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silent complication, remaining asymptomatic in its early stages. However, chronic hyperglycemia can progressively damage the retina, leading to fluid accumulation and the formation of hemorrhages, which may result in cloudy or blurred vision. If not addressed, this condition can culminate in severe visual impairment or even blindness.[9, 10] Hence; the present study was conducted to assess risk factors profile of diabetic retinopathy.

The mean age of the patients of the study group and control group was 51.3 years and 48.2 years respectively. There were 62 males and 38 females in the study group and there were 66 males and 34 females in the control group. Positive family history of diabetes was seen in 43 patients of the study group and in 12 patients of the control group. 65 percent of the cases of the study group had mild NPDR while 23 percent had moderate NPDR.Yin L et al conducted a comprehensive analysis of the demographic, physical, serological, and ocular features of individuals diagnosed with diabetes mellitus. The findings indicated that patients with diabetic retinopathy were predominantly older (P=.0003), male (P=.018), and more likely to have hypertension (P<.0001), as well as elevated body mass index (P<.0001), metabolic irregularities, and a prolonged duration of diabetes (P<.0001). Additionally, these patients presented with increased intraocular pressure (P=.0008), elevated fasting blood glucose levels (P<.0001), and higher serum concentrations of total cholesterol (P<.0001) and triglycerides (P=.0006). Furthermore, a significant correlation was observed with % glycated hemoglobin (HbA1c) (P<.0001) and disc asymmetry, including the cup–disc ratio (P=.041). Other factors associated with diabetic retinopathy included age (P=.049), male gender (P=.048), hypertension (P=.048), duration of diabetes (P=.012), diabetic neuropathy (P=.048), diabetic nephropathy (P=.048), diabetic foot ulcers (P=.041), foot amputations (P=.042), fasting blood glucose (P=.022), serum total cholesterol (P=.028), serum triglycerides (P=.035), and HbA1c (P=.042).[11]

In the present study, Geriatric age, presence of dyslipidemia, hypertension & obesity along with positive family history of diabetes were found to be significant risk factors for occurrence of DR.Nga VV et al investigated the clinical and subclinical features of Vietnamese diabetic retinopathy patients. The research enrolled 140 type 2 diabetic patients (70 in each group: DR and no DR). DR patients had significantly higher age, RBC, Hb, eGFR, uric acid, and creatinine blood levels than patients without DR. The duration of diabetes mellitus of over 15 years was associated with an 8.319-fold increased risk of DR. Age, RBC, Hb, eGFR, uric acid, creatinine blood levels and duration of diabetes mellitus over 15 years are risk factors for DR.[12]Javadi et al reported that the prevalence of DR was 1.55 times higher in diabetic patients with hypertension. They also found a positive, but not statistically significant association between hyperlipidemia and DR. Moreover, a study in Nepal showed that diabetic patients with hypertension were 2.41 times more likely to develop DR.[13, 14]

CONCLUSION

Diabetes mellitus is a complex metabolic disease with DR being one of its significant complications associated with significant morbidity. It is not possible to define which diabetic individuals will present retinopathy. However, it is possible to determine risk factors related to the development of retinopathy.

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